URGENT – REPLY TO FINAL OFFICE ACTION

LISTING OF CLAIMS

1 (currently amended). In wet electrostatic precipitation-based apparatus for detecting the presence of an airborne chemical or biological analyte, the improvement comprising:

a gas- and liquid-containing chamber;

means for introducing an analyte-free collection liquid into said chamber;

means for rapidly sampling a volume of ambient air and transferring said analyte therefrom into said collection liquid, said sampling means comprising an air intake means, ~~and end~~ an air venting means~~t~~, and

means for removing from said chamber an analyte-enriched collection liquid;

wherein said volume of air passes through a preferably horizontal air inlet and thence through a preferably vertical electrically conductive collector electrode tube with means for applying an electric field between said tube and a co-axial spiked wire- or rod-shaped discharge electrode, said collector tube and discharge electrode forming part of said chamber,

wherein said electric field is high enough to effectuate a corona discharge so as to generate ionized particles that could be driven towards said collector electrode by an electric field.

2 (currently amended). The apparatus of claim 1, comprising means for introducing a fine mist of droplets into said collector tube so as to cause substantially full wetting of the inner surface of said tube by a liquid film.

3 (previously presented). The apparatus of claim 2, wherein said mist is generated by an ultrasonic humidifier.

4 (previously presented). The apparatus of claim 2, comprising means for generating and transmitting ultrasonic waves across the interface between said tube and said liquid film so as to help transfer particles or biological cells adhering to the tube surface from said surface into said film.

5 (currently amended). In a wet electrostatic precipitation-based method for detecting the presence of an airborne chemical or biological analyte, the improvement comprising the steps of:

providing a gas- and liquid-containing means;

introducing an analyte-free collection liquid into said containing means;

rapidly ~~sampling~~ passing a volume of ambient air through a sampling means forming part of said containing means and comprising an air intake means and an air venting means and transferring said analyte therefrom into said collection liquid~~, said sampling means comprising an air intake means and an air venting means~~; ~~and~~

~~removing from said containing means an analyte-enriched collection liquid;~~

by passing said volume of air through a preferably horizontal air inlet and thence through a preferably vertical collector electrode tube; ~~and~~ while applying an electric field between said tube and a co-axial spiked wire- or rod-shaped discharge electrode,

wherein said electric field is high enough to effectuate a corona discharge so as to generate ionized particles that could be driven towards said collector electrode by an electric field; and

removing from said containing means an analyte-enriched collection liquid.

6 (currently amended). The method of claim 5, comprising the step of introducing a fine mist of droplets into the air stream passing through said collector tube so as to cause substantially full wetting of the inner surface of said tube by a liquid film.

7 (previously presented). The improvement of claim 6, wherein said mist is generated ultrasonically.

8 (previously presented). The improvement of claim 6, comprising the step of generating and transmitting ultrasonic waves across the interface between said tube and said liquid film so as to help transfer particles or biological cells adhering to the tube surface from said surface into said film.

9 (previously presented). The apparatus of claim 1, wherein said collector electrode is tube-shaped with its inner surface electrically conducting.

10 (previously presented). The apparatus of claim 1, wherein said collector electrode is a metal or other electrically conductive material or comprises an electrically conductive coating or foil applied to the inner surface of a non-conductive tube.

11 (previously presented). The apparatus of claim 9, wherein said collector electrode has a roughened preferably sandblasted inner surface.

12 (previously presented). A method of capturing for detection aerosolized particles as small as 0.01 micron in size from a volume of air which comprises passing said air through an electrostatic precipitation-based aerosol collector.

13 (previously presented). The method of claim 12, wherein said particles are virus particles.

14 (previously presented). The method of claim 12, wherein said particles are toxin particles.

URGENT – REPLY TO FINAL OFFICE ACTION

15 (currently amended). The apparatus of claim 1, comprising means for keeping said central wire-or rod-shaped discharge electrode at a high negative or positive potential [possibly of as much 10 KV or higher] and wherein said collector electrode is tube-shaped with its inner surface electrically conducting, and said horizontal tubular air intake is large enough to permit air to enter unimpeded at a high flow rate, possibly as high as 500 liters/minute or higher, with a minimal pressure drop.

16 (previously presented). The apparatus of claim 2, comprising means for assuring that said liquid film be at least 25 microns thick, so as to minimize collection losses due to captured particles adhering too firmly to the collector electrode.

17 (currently amended). The apparatus of claim 16, comprising means for ~~foorming~~ forming said liquid film by dripping liquid from the top down a roughened, preferably sandblasted, metal surface and/or by liquid droplets that are carried by the sampled air.

18 (previously presented). The apparatus of claim 16, comprising means for fine-tuning the thickness of said liquid film by adjustments of the power of the exhaust air blower and of the inter-electrode voltage and electric field distribution such as to assure that the introduced mist results in proper wetting of the collector electrode without causing unwanted spark discharges.

19 (currently amended). The apparatus of claim 1, wherein ~~the design of~~ said electrodes and ~~the adjustment of~~ said electric field are ~~such~~ so designed as to generate a sufficient corona to ionize most of the particles in the air stream and a sufficient electric field to deposit most of these particles at the collector electrode, and wherein the length and diameter of said collector electrode are such as to allow an adequate residence time for most particles to reach it rather than be carried away with the air stream.

20 (previously presented). The apparatus of claim 4, comprising means for operating the system in alternating dry and wet modes so as to cut down on evaporation losses during operation in the dry mode and thus reduce the water replenishment requirements and to also limit the occurrence of any power losses due to spark discharges to relatively brief wet wash-down periods.